2019 年 8 月 21 日

# 博士論文審査結果報告

**Report on Ph.D. / Doctoral Dissertation Defense**

National Graduate Institute for Policy Studies (GRIPS)
Associate Professor（joint-appointment） YOROZUYA, Atsuhiro

審査委員会を代表し、以下のとおり審査結果を報告します。

On behalf of the Doctoral Thesis Review Committee, I would like to report the result of the Doctoral Dissertation Defense as follows.

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| 学位申請者氏名<br>Ph.D. Candidate | Ahmad Ali Gul | | |
| 学籍番号<br>ID Number | DOC16131 | | |
| プログラム名<br>Program | 防災学プログラム<br>Disaster Management Program | | |
| 審査委員会<br>Doctoral Thesis Review Committee | 主査<br>Main referee | 萬矢　敦啓<br>YOROZUYA, Atsuhiro | 主指導教員<br>Main Advisor |
| | 審査委員<br>Referee | 江頭　進治<br>EGASHIRA, Shinji | 副指導教員<br>Sub Advisor |
| | 審査委員<br>Referee | 家田　仁<br>IEDA, Hitoshi | 副指導教員<br>Sub Advisor |
| | 審査委員<br>Referee | 土谷　隆<br>TSUCHIYA, Takashi | 博士課程委員会委員長代理<br>Acting Chairperson of the Doctoral Programs Committee |
| | 審査委員<br>Referee | 中川　一<br>NAKAGAWA, Hajime<br>京都大学防災研究所<br>Disaster Prevention Research Institute, Kyoto University | 外部審査委員<br>External Referee |
| 論文タイトル<br>Dissertation Title<br>(タイトル和訳)※<br>Title in Japanese | Fundamental Study For 2-D Numerical Simulation of Channel Changes in Large Rivers Dominated by Fine Sediment<br><br>微細砂卓越大河川における平面二次元河床変動計算に関する基礎的研究 | | |
| 学位名<br>Degree Title | 博士（防災学）/ Ph.D. in Disaster Management | | |
| 論文提出日<br>Submission Date of the Draft Dissertation | 2019 年 5 月 31 日 | 論文審査会開催日<br>Date of the Doctoral Thesis Review Committee | 2019 年 7 月 9 日 |
| 論文発表会開催日<br>Date of the Defense | 2019 年 7 月 9 日 | 論文最終版提出日<br>Submission Date of the Final Dissertation | 2019 年 8 月 21 日 |
| 審査結果<br>Result | 合格<br>Pass | 不合格<br>Failure | |

※ タイトルが英文の場合、文部科学省に報告するため、和訳を付してください

Please add a Japanese title that will be reported to MEXT.

1. 論文要旨 Thesis overview and summary of the presentation.

A water intake structure, such as a barrage, is a fundamental infrastructure in a region of the semi-arid climate. For example, most of Pakistan is semi-arid and the several structures exist along the Indus River. Actually, water distribution system including the barrages and the canal system designed well and contributed to agricultural industries. However, it is not always the case for high flow discharges. The river discharge at Pakistan Floods of 2010 was the second highest in 50 years. By this flood, several damages were reported. In order to evaluate the system as the hydraulic structure for flood condition, one of the options is to use a numerical model to simulate the water flow, sediment transport rate, and river bed elevation changes.

The dissertation centers a fundamental study for the numerical simulation. In particularly, the river like the Indus River is a suspended-sediment dominated river. It means that the bed material is composed by mostly fine sediment, which is classified as the suspended-sediment. In particular, the boil phenomena recognized as one of the largest phenomena affecting to behavior of the fine sediment. However, this is not implemented to the current numerical model. The dissertation composed with four different elements; such as observation of the boil, modeling the boil, implementing to the numerical simulation, and discussion about policy implications.

The dissertation firstly clarifies the mechanism of the boil phenomena by observational results in order to model the boil. The observation was conducted in the Brahmaputra river in Bangladesh, which is one of suspended-sediment dominated river. With implementing the recently developed acoustic technologies, several boil phenomena were observed in terms of flow structure, special/temporal distribution of the fine sediment. Secondly, with simplifying the mechanism, the dissertation models the boil and implements the model in the numerical simulation. Finally, the dissertation evaluates the difference between with/without implementing the boil phenomena.

The contribution of this study is tackling to the fundamental sediment hydraulics with recently developed observational system. It would be ideal if the dissertation conducted the numerical simulation for the Indus river with newly implemented model by this study, as well as described the results in order to offer a discussion material to the policy maker. But it could not be done within one Ph.D dissertation. The dissertation, however, is a fundamental study as the title indicates, and can provide the tools for further discussion.

2. 審査報告 Notes from the Doctoral Thesis Review Committee (including changes required to the thesis by the referees)

Among the members of the doctoral thesis review committee, there was a general consensus about the value of this study.

The members made several questions and comments. It can be summarized as follows;

1. how the research results contribute to the practical management in the real field,
2. the description about how the scientific technique can be used by the policy maker is poor,
3. the modeling parts should be clearly described,
4. evaluation of the newly developed model should be conducted even with simple idealistic channel,

The members of the committee reached conclusions that revisions should be made following these comments. The members let the candidate work for additional one month to revise it. Thereafter, the members would check a revised version within weak after its submission.

3. 最終提出論文確認結果 Confirmation by the Main Referee that changes have been done to the satisfaction of the referees

About one month after the defense, the revised version submitted by the candidate was sent to

the committee members. They checked the new version and found that the revisions were made appropriately, though there were still minor comments. Thus, they left the final check entirely to the main adviser. The main adviser checked the revised version, and told the candidate to add a few minor revisions. On August 21, 2019, the final version was submitted and the main adviser found it satisfactory.

## 4. 最終審査結果 Final recommendation

The doctoral thesis review committee recommends that GRIPS award the degree of Ph.D. in Disaster Management to Mr. Ahmad Ali Gul.